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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1 53(b))

Attorney Docket No	7146.007
Total Pages	1
First Named Inventor or Application Identifier	Westerman, Larry
Express Mail Label No.	EM571164010US

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: Assistant Commissioner for Patents, Box Patent Application, Washington, DC 20231

1. [X] Fee Transmittal Form *(Submit an original, and a duplicate for fee processing)*
2. [X] Specification [Total Pages 17] *(preferred arrangement set forth below)*
   - Descriptive title of the Invention
   - Cross References to Related Applications
   - Statement Regarding Fed sponsored R & D
   - Reference to Microfiche Appendix
   - Background of the Invention
   - Brief Summary of the Invention
   - Brief Description of the Drawings *(if filed)*
   - Detailed Description
   - Claim(s)
   - Abstract of the Disclosure
3. [X] Drawing(s) *(35 USC 113)* [Total Sheets 2]
4. Oath or Declaration [Total Pages 1]
   - a [X] Newly executed (original or copy)
   - b. [ ] Copy from a prior application (37 CFR 1.63(d)) *(for continuation/divisional with Box 17 completed) [Note Box 5 below]*
     - i. [ ] DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
5. [ ] Incorporation By Reference *(useable if Box 4b is checked)* The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. [ ] Microfiche Computer Program *(Appendix)*
7. Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all necessary)*
   - a. [ ] Computer Readable Copy
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ACCOMPANYING APPLICATION PARTS

8. [X] Assignment Papers (cover sheet & document(s))
9. [X] 37 CFR 3.73(b) Statement *(when there is an assignee)* [X] Power of Attorney
10. [ ] English Translation Document *(if applicable)*
11. [ ] Information Disclosure Statement (IDS)/PTO-1449 [ ] Copies of IDS Citations
12. [ ] Preliminary Amendment
13. [X] Return Receipt Postcard (MPEP 503) *(Should be specifically itemized)*
14. [ ] Small Entity Statement(s) [ ] Statement filed in prior application, Status still proper and desired
15. [ ] Certified Copy of Priority Document(s) *(if foreign priority is claimed)*
16. [ ] Other: .....

17. If a **CONTINUING APPLICATION**, *check appropriate box and supply the requisite information:*
    [ ] Continuation [ ] Divisional [ ] Continuation-in-part (CIP) of prior application No: _____/_____

18. CORRESPONDENCE ADDRESS

[ ] *Customer Number or Bar Code Label* *(Insert Customer No. or Attach bar code label here)* or [X] *Correspondence address below*

NAME	Kevin L. Russell Chernoff, Vilhauer, McClung & Stenzel, LLP				
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Attorney's Docket KLR:7146.007

FEE TRANSMITTAL FORM

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT APPLICATION EXAMINING OPERATIONS

Applicant : Larry Alan Westerman

Group Art Unit:

Serial No :

Examiner:

Filed : Filed concurrently herewith

Title : DOCUMENT CLASSIFICATION SYSTEM

CLAIMS AS FILED

For	No. Filed	No. Extra
BASIC FEE	xxxxxxxxxxxxxxxxxxxxxxx	
TOTAL CLAIMS	18 - 20	-0-
INDEP CLAIMS	2 - 3	-0-
MULTIPLE DEPENDENT CLAIM PRESENT		

SMALL ENTITY

Rate	Fee
xxxxxxxx	$ 395
x $11	$
x $41	$
x$135	$
TOTAL	$

OTHER THAN A SMALL ENTITY

Rate	Fee
xxxxxxxxx	$ 790
x $22	$
x $82	$
x$270	$
TOTAL	$ 790

[ ] Please charge my Deposit Account No. **03-1550** in the amount of $_____.

[X] A duplicate copy of this sheet is enclosed.

[X] A check in the amount of $ 790.00 to cover the filing fee is enclosed.

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[X] The Commissioner is hereby authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. **03-1550.** A duplicate copy of this sheet is enclosed.

[X] Any additional filing fees required under 37 CFR 1.16.

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[X] Any patent application processing fees under 37 CFR 1.17.

December 5, 1997
Date

Kevin L. Russell

CHERNOFF, VILHAUER, McCLUNG & STENZEL, LLP
600 Benj. Franklin Plaza
One Southwest Columbia
Portland, Oregon 97258

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE UNDER 37 CFR § 3.73(b)

Applicant : Larry Alan Westerman

Application No: _____ Filed: Concurrently herewith

Title : DOCUMENT CLASSIFICATION SYSTEM

Sharp Laboratories of America, Inc.
(Assignee)

a Washington corporation
(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

certifies that it is the assignee of the entire right, title and interest in the patent application identified above by virtue of either:

A. [ ] An assignment from the inventor(s) of the patent application identified above. The assignment was recorded in the Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

OR

B. [ ] A chain of title from the inventor(s), of the patent application identified above, to the current assignee as shown below:

1. From: _____ To: _____
The document was recorded in the Patent and Trademark Office at Reel _____, Frame _____, or for which a copy is attached.

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[ ] Additional documents in the chain of title are listed on a supplemental sheet.

[x] Copies of assignments or other documents in the chain of title are attached. (Where one or more of the documents is unrecorded.)

The undersigned has reviewed all the documents in the chain of title of the patent application identified above and, to the best of undersigned's knowledge and belief, title is in the assignee identified above.

The undersigned (whose title is supplied below) is empowered to sign this Certificate on behalf of the assignee.

I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further, that these statements are made with the knowledge that willful false statements, and the like so made, are punishable by fine or imprisonment, or both, under Section 1001, Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date : December 5, 1997

Name : Kevin L. Russell

Title : Attorney for the Assignee (a copy of the Power of Attorney is attached)

Signature: _____

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT APPLICATION EXAMINING OPERATIONS

Applicant :	Larry Alan Westerman	Group Art Unit:
Serial No :		Examiner:
Filed :	Filed concurrently herewith	
Title :	DOCUMENT CLASSIFICATION SYSTEM	

POWER OF ATTORNEY

I, Jon K. Clemens, declare that I am the President and Chief Executive Officer of Sharp Laboratories of America, Inc., a Washington corporation, and am authorized to execute this document on its behalf. Sharp Laboratories of America, Inc., is the assignee of the entire right, title and interest in the above-referenced patent application and hereby appoints Jacob E. Vilhauer, Jr., Reg. No. 24,885, Charles D. McClung, Reg. No. 26,568, Dennis E. Stenzel, Reg. No. 28,763, Donald B. Haslett, Reg. No. 28,855, William O. Geny, Reg. No. 27,444, J. Peter Staples, Reg. No. 30,690, Karen Dana Oster, Reg. No. 37,621, Kevin L. Russell, Reg. No. 38,292, Nancy J. Moriarty, Reg. No. 40,733, Bruce W. DeKock, Reg. No. 40,585, and Timothy E. Siegel, Reg. No. 37,442, all of the firm of CHERNOFF, VILHAUER, McCLUNG & STENZEL, LLP, 600 Benj. Franklin Plaza, One Southwest Columbia, Portland, Oregon 97258, telephone number 503-227-5631, its attorneys, jointly and individually, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated: Dec. 1, 1997

Jon K. Clemens
President and Chief Executive Officer
SHARP LABORATORIES OF AMERICA, INC.

C:\TEMP\SHARP005.POA

CERTIFICATE OF MAILING

BY "EXPRESS MAIL"

Express Mail No. EM571164010US

Date of Deposit: December 5, 1997

I hereby certify that the patent application attached hereto entitled DOCUMENT CLASSIFICATION SYSTEM, Larry Alan Westerman, inventor, together with the attached fees, is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" on the date indicated above and is addressed to Box PATENT APPLICATION, Assistant Commissioner for Patents, Washington, D.C. 20231.

Matthew Roberts

DOCUMENT CLASSIFICATION SYSTEM

BACKGROUND OF THE INVENTION

The present invention relates to an improved document classification system, and in particular to a document classification system that incorporates eye gaze information.

In traditional information management systems a document was considered a homogeneous set of data to be stored and retrieved as a single unit. Nevertheless, as the need arose to use the same information in different environments and in different cognitive contexts, the concept of the document has evolved. For example, typical medical documents are composed of anagraphic data, anamnesis (past medical history), reports, and images. Each of the different portions of such medical documents may need to be queried differently. For example, a general physician might consider the whole document as a specific patient description, and therefore ask for comments linked to a given person's name. On the other hand, a specialist might focus on classes of diagnosis from radiologic exams and might want to formulate a related query for images with analogous pathological contents. Accordingly, many document retrieval and identification systems need to be capable of searching documents that include text, images, and structured data.

The primary problem in automated document management is properly indexing all of the documents. Indexing involves assigning to each document, or portion of a document, a synthetic descriptor facilitating its retrieval. The assignment of such a descriptor is generally performed by the steps of: (1) extracting relevant entities or characteristics as index keys; (2) choosing a representation for the keys; and (3) assigning a specific meaning to the keys. A detailed description of such indexing is described in Marsicoi, et al.,

Indexing pictorial documents by their content: a survey of current techniques: Image and Vision Computing, 15 (1997), pp. 119-141, incorporated by reference herein.

Images deserve special attention within a document management system because of the difficulty of addressing the content of an image using traditional textual query languages and indices. Images are no longer considered as pure communication objects or appendices of a textual document, but rather images are now considered self-describing entities that contain related information (content) that can be extracted directly from the image. For this reason, prior to storing an image in a database, a description activity is performed to process the image, analyze its contents, interpret its contents, and classify the results. Accordingly, the need arises to develop systems to allow content-based image extraction and retrieval.

Textual entities are readily extracted from documents by automated systems and stored in a database for later use. In contrast, it is difficult to formulate rules for the identification of relevant objects to be extracted from images. This difficulty is partly a result of the multitude of factors influencing the image acquisition, namely, instrumentation tuning and precision, sampling, resolution, visual perspective, and lighting. All of these factors introduce noise in the visual rendering of pictorial objects which modify their morphological and geometric characteristics. Further, objects from a natural scene show a high degree of variation in their characteristics. For example, while it might be easy to define a set of rules that identify a pattern of pixels representing a circle, the task is much more difficult to define a set of rules to detect a pattern of pixels representing a tree. This increased difficulty necessitates the adoption of image analysis systems based on the general similarity of a known object, as opposed to an exact match of a known object.

A typical image analysis system first identifies and extracts objects from an image and then represents their relations. Spatial entities can be represented in many complimentary ways depending on the task requirements. For example, the same object may be represented by the chain code of its contour, by the minimum rectangle enclosing it, by a set of rectangles covering its area, or by related graphs.

Once the image analysis system has represented the object, the objects and spatial relations from the image are classified, i.e. associated with real object features, and described according to the observer's interest. Image classification is not unique in that the same pictorial entity can be classified to different real objects. For example, a circular shape can be interpreted as a wheel, a ball, or a disk. Whether this level of semantic discrimination is necessary depends on the informative context. Although image classification and derived indexing methods are not unique, they can be effective for specific applications where the pictorial entities are well-defined. However, general indexing for images is much harder and as yet an unsolved problem.

FIG. 1 shows a typical document management system 10 in which a user 20 formulates his information retrieval request 12 as a query 14 in a query language. The query 14 is received by a matching system 16 that matches it against documents in a document database 18. Documents containing relevant data are retrieved and forwarded to the user 20.

The primary goal of the document management system 10 is to easily, efficiently, and effectively retrieve from the database 18 documents relevant to a certain user's need. This requires the system to have a meaningful indexing scheme for all documents. In the case of images, a meaningful indexing scheme means that the extracted information from an image should be related

to the represented pictorial entities (objects), to their characteristics, and their relations.

The indices representing image content may be a textual string obtained by manual annotation or by an automatic analysis module. In the latter case, many of the approaches to indexing require pattern recognition techniques.

The automatic analysis of image content requires the design of efficient and reliable segmentation procedures. In applications such as mechanical blueprints, there are features that are exactly defined and easily recognizable. In contrast, natural images have few features that are easily identifiable. Accordingly, present algorithms are only capable of effectively dealing with limited classes of images. In particular, they work with a small number of non-overlapping objects on an easily identifiable and separable background, and in general require knowledge of the lighting conditions, of the acquisition devices, and of the object context and its features.

One analysis technique used to extract information from an image is to perform interactive segmentation by providing semi-automatic object outlining. The user assists the system by indicating with a pointer or box the exterior contour of the object of interest. Alternatively, the system may use edge pixels having a high color gradient (not necessarily identifying the complete contour of an object) which are matched with known edge patterns from a database. In either case, the outline of the object must be identified for the system. In particular, this requires a closed loop area and not merely a general region of the image where the object is located.

There exist many automatic techniques for analyzing pictorial images to extract relevant information therefrom. Some of the techniques may be grouped as color histograms, texture identification,

shape identification, and spatial relations. The color histogram technique determines the predominant colors. For example, a predominant green color may be a lawn or forest, and a predominant blue color may be an ocean (if within the lower portion of the image) or a sky (if within the upper portion of the image).

The texture extract technique is used to extract relevant information from an image based on the texture of the image which is normally its frequency content. Typically, the frequency content of the image is obtained from its power spectrum density which is computed by a Fourier transform. The texture pattern is matched against known texture patterns to identify objects.

The shape identification technique is used to extract relevant information from an image. Shape identification typically uses either a function identifying a closed loop contour of an object or a closed loop edge identification of an image, and therefore matching the closed loop contour or edge to known objects. This technique may be used, for example, to identify faces which are generally round. Unfortunately, it is difficult to distinguish between features with similar shapes, such as distinguishing faces from clocks.

The spatial relations technique is used to extract relevant information to match a pattern. Such a spatial relation may be, for example, a tank within the image.

Any of the aforementioned techniques may be used in combination and further may include a prediction of where to expect to find particular features. For example, the document management system may expect to locate circular faces on the upper center portion of the image, and may expect to locate blue sky on the upper portion of the image.

The aforementioned systems are mechanical in nature and require mathematical mechanistic processing of

each image to extract information that is then compared to a large number of possibilities in order to identify image content. While it is possible to supplement the aforementioned mechanistic system with the assistance of a person identifying closed loop outlines of images, or identifying the nature of the image with textual entries, this becomes a burdensome task, especially if a large number of images are involved. Further for complex images, these techniques often result in poor results because the specific element of interest in the image may not be a dominant contributor to the overall color, texture, shape, and spatial relations.

What is desired, therefore, is a technique for image identification that increases the likelihood of identifying the content of an image while reducing the processing required for such identification.

BRIEF SUMMARY OF THE INVENTION

The present invention overcomes the aforementioned drawbacks of the prior art by providing an image system with an imaging device that obtains and presents at least one image. An eye gaze system associated with the imaging device determines a non-closed loop portion of the at least one image that an eye of a viewer observes. The image system associates the at least one image with the non-closed loop portion of the at least one image.

The eye of the person obtaining the image is naturally drawn toward the important portion of the image. This occurs whether or not the person is trained to concentrate his gaze on the important aspect of the image or not. The gaze information of the viewer is maintained together with the image which provides a key additional piece of data for the processing of the image to identify the important aspects of the image.

In another aspect of the present invention an image processor analyzes the image based at least in part

on the image itself together with data representative of the gaze information to determine the content of the image, where the gaze information is a non-closed loop portion of the image that an eye of a viewer observes. The image system associates the content with the image.

Preferably the non-closed loop portion is transformed into a closed loop portion of the image and the image processor analyzes the image based at least in part on the image itself together with the closed loop portion to determine the content of the image. Identification of the important region of the image permits focusing the image processor on those portions thereby reducing the computational requirements of the system.

The foregoing and other objectives, features, and advantages of the invention will be more readily understood upon consideration of the following detailed description of the invention, taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

FIG. 1 is a block diagram of a document management system.

FIG. 2 is a block diagram of an exemplary embodiment of an image analysis system including an eye gaze system of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Existing techniques for the identification of image content are based on the premise that with sufficiently complex and innovative algorithms, together with unlimited computer resources, the image itself can be processed to determine its content. The image processing may also be supplemented with factors influencing the image acquisition itself, such as, lighting conditions and device settings. Unfortunately, existing systems are not capable of reliably identifying

which aspects of the image content are important. Further, existing systems are not capable of taking into account the aesthetic quality of an image. In response to the aforementioned limitations, as previously discussed, some existing systems supplement the analysis of image content by additional manual identification of important features of the image with a closed loop path, which is time consuming and expensive.

In contrast to existing systems, the present inventor came to the realization that the eye gaze of the user viewing the image is naturally drawn toward the aesthetically important portion of the image. For example, when obtaining an image with a camcorder or camera the gaze of the user tends to be drawn to the image portion that the particular user considers the most important region of the image. This occurs whether or not the user is trained to concentrate his gaze on the important aspects of the image. For example, in a scene consisting of primarily grass together with a tiger standing at the upper left portion of the scene, the user's gaze will most likely be directed toward the tiger. The user's gaze information is the general region of interest that the viewer's gaze is observing, as opposed to a closed loop region of an object within the image.

In contrast to existing systems that only use the content of the image itself to determine its content, the present inventor realized that gaze information can be obtained and used together with the content of the image to provide key additional data for improved processing of the image. For example, when obtaining an image with a camera (still or video) the user naturally gazes at the aesthetically important aspect or at the region of particular interest within the image. The gaze information is either stored with the image or associated with the image if stored elsewhere.

Gaze information refers preferably to that portion of the image that the user primarily views while viewing the image. Alternatively, the gaze information may be any portion of the image viewed. The gaze information may be a single point or a series of points within the image. Alternatively, the gaze information may relate to one or more regions within the image. The gaze information is preferably obtained substantially contemporaneously with obtaining the image. Alternatively, the gaze information may be obtained later by presenting an image to a user for viewing. Since the gaze information refers to a point(s) and/or a region(s) of the image, it is not defined by a closed loop outline drawn by the user of an object of particular interest, as in prior art systems.

The eye gaze information may be recorded as a system of weights of points or regions of the image, or the gaze information may be used as the basis to identify a region of the image for further analysis to determine its content.

Alternatively, the gaze information may be used to define a closed loop portion of the image for further analysis, such as identifying a polygonal region around the gaze region(s).

The image processing system which determines the content of the image may include any of the previous systems together with the gaze information. The gaze information is used to identify those portions of an image that are of particular interest or of aesthetic quality to the user. This identification permits the system to focus processing on particular portions of an image. Accordingly, those portions distant from the gaze area may be discarded, if desired, as not being of particular interest in classifying the contents of the image.

An Advanced Photo System (APS) camera uses a film that includes a generally transparent thin layer of

magnetic material over either a portion of or all of the film. The magnetic material is suitable to encode digital information therein. Traditionally, the magnetic material records conditions that exist when the photo was taken, such as lighting and camera settings (speed, shutter speed, aperture, time of day, date), that are used to improve the quality of subsequent film developing. All of these conditions that are recorded are suitable for optimization of subsequent image development and not primarily concerned with the analysis and categorization of the content of the image. The camera of the present invention further includes an eye gaze system which determines the portion of the image the user gazes at.

Other suitable still cameras (analog or digital) and video cameras (analog or digital) may likewise be used. For example, a digital camcorder and a digital camera may include an eye gaze system that stores the gaze information digitally on the video or the film, respectively. Other examples may include traditional film based cameras and analog video cameras where the gaze information is stored on the film or video, respectively. Alternatively, the gaze information for any type of image acquisition device may be recorded on any suitable format and location for later use by the image analysis system.

Referring to FIG. 2, an eye gaze system 42, as previously described, includes an imaging device 40 together with an eye gaze system 42. The eye gaze system 42 is preferably integral with the imaging device 40. The image 44 from the imaging device 40 and gaze information 46 from the eye gaze system 42 are processed by an image analysis system 48. The image analysis system 48 may use any suitable image analysis techniques that further incorporate eye gaze information, as previously described. The results of the image analysis

system 48 are stored in the database 18 for later retrieval.

The terms and expressions which have been employed in the foregoing specification are used therein as terms of description and not of limitation, and there is no intention, in the use of such terms and expressions, of excluding equivalents of the features shown and described or portions thereof, it being recognized that the scope of the invention is defined and limited only by the claims which follow.

CLAIMS

1. An image system comprising:

(a) an imaging device that at least one of obtains and presents at least one image;

(b) an eye gaze system associated with said imaging device that determines a non-closed loop portion of said at least one image that an eye of a viewer observes; and

(c) said image system associating said at least one image with said non-closed loop portion of said at least one image.

2. The image system of claim 1 wherein said imaging device is at least one of a film based still camera, a film based video camera, a digital based still camera, and a digital based video camera.

3. The imaging system of claim 1 wherein said imaging device presents said at least one image to said user at a time subsequent to recording said image.

4. The imaging system of claim 1 wherein said eye gaze system is integral with said imaging device.

5. The imaging system of claim 1 wherein said non-closed loop portion is within said at least one image.

6. The imaging system of claim 1 wherein said non-closed loop portion is a point within said at least one image.

7. The imaging system of claim 1 wherein said non-closed loop portion is a region of said image.

8. The imaging system of claim 1 wherein said image system associating is storing said non-closed loop portion on a recording media of said imaging device.

9. The imaging system of claim 1 wherein said non-closed loop portion is used at the basis to define a closed-loop portion of said at least one image.

10. The imaging system of claim 1 wherein said at least one image is said obtained substantially contemporaneously with said non-closed loop portion.

11. The imaging system of claim 1 further comprising an image processor that identifies the content of said at least one image based on the content of the image together with said non-closed loop portion.

12. An image system comprising:

(a) an image processor which analyzes an image based at least in part on said image itself together with data representative of gaze information to determine the content of said image, where said gaze information is a non-closed loop portion of said image that an eye of a viewer observes; and

(b) said image system associating said content with said image.

13. The image system of claim 12 wherein said gaze information is transformed into a closed loop portion of said image and said image processor analyzes said image based at least in part on said image itself together with said closed loop portion to determine the content of said image.

14. The imaging system of claim 12 wherein said non-closed loop portion is within said at least one image.

15. The imaging system of claim 12 wherein said non-closed loop portion is a point within said at least one image.

16. The imaging system of claim 12 wherein said non-closed loop portion is a region of said image.

17. The imaging system of claim 12 wherein said image processor includes at least one of shape identification, texture identification, color identification, and spatial identification.

18. The imaging system of claim 12 further comprising storing said content in a database.

DOCUMENT CLASSIFICATION SYSTEM

ABSTRACT OF THE DISCLOSURE

An image system with an imaging device obtains and presents at least one image. An eye gaze system associated with the imaging device determines a non-closed loop portion of the at least one image that an eye of a viewer observes. The image system associates the at least one image with the non-closed loop portion of the at least one image. An image processor analyzes the image based at least in part on the image itself together with data representative of the gaze information to determine the content of the image, where the gaze information is a non-closed loop portion of the image that an eye of a viewer observes. The image system associates the content with the image.

DECLARATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled:

DOCUMENT CLASSIFICATION SYSTEM

the specification of which

[X] is attached hereto.

[ ] was filed concurrently herewith as Application Serial No. ________________ and was amended on ____________________. (if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claim(s), as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, § 1.56.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated: 1 DEC 1997	Larry A Westerman
Full name of sole inventor	Larry Alan Westerman
Residence	Portland, Oregon
Citizenship	United States of America
Post Office Address	3707 NW Thurman Street Portland, OR 98682 United States of America

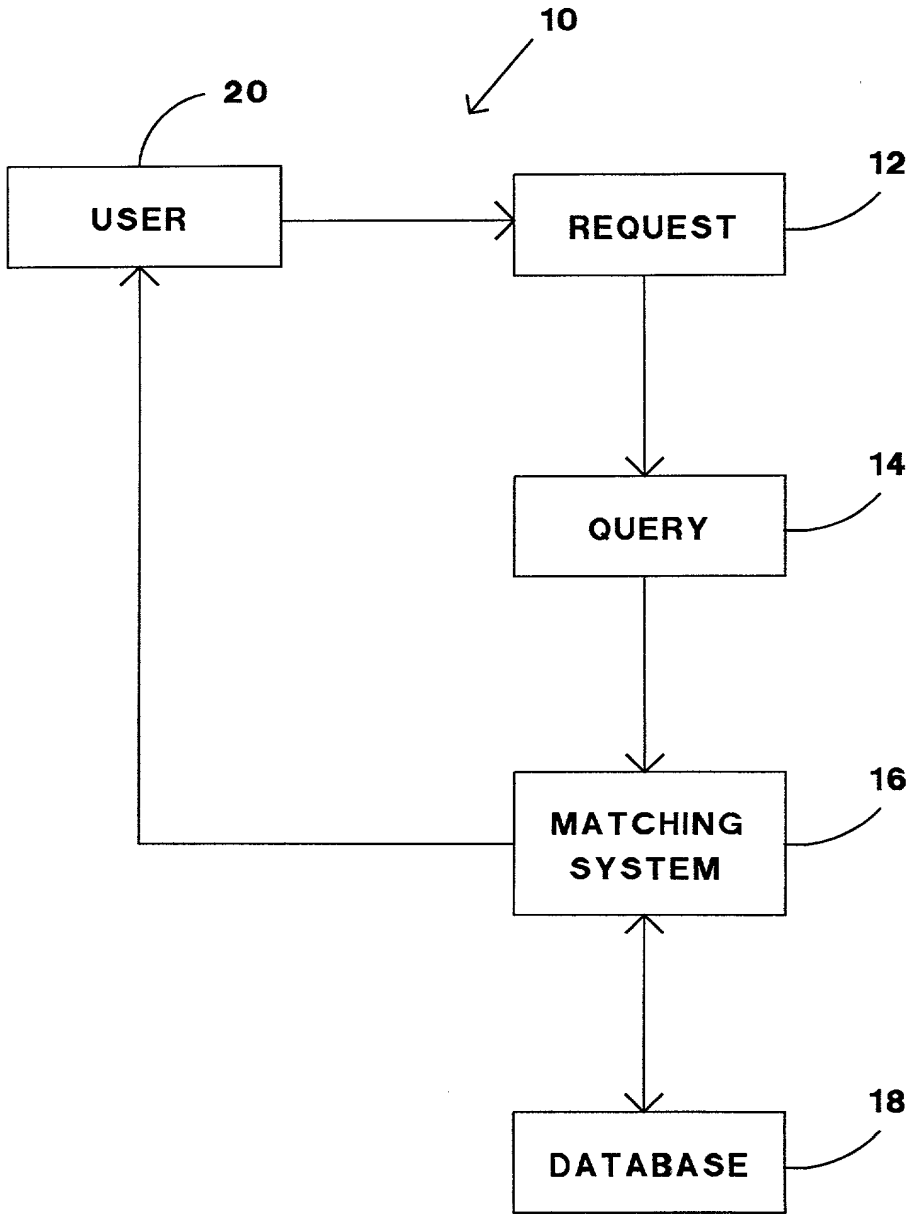
10
20
USER
REQUEST
12
QUERY
14
MATCHING SYSTEM
16
DATABASE
18

FIG. 1

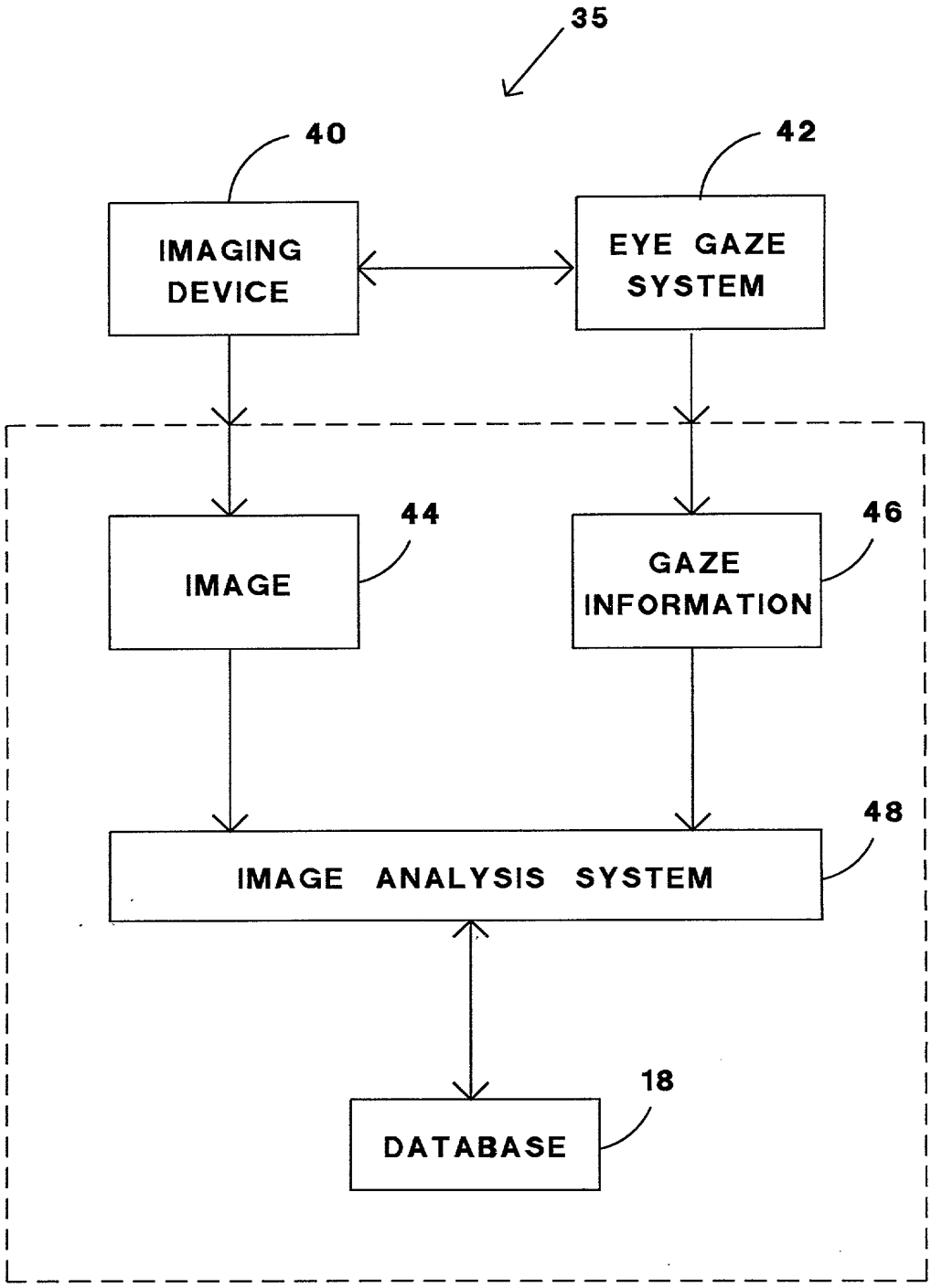
35
40
42
IMAGING DEVICE
EYE GAZE SYSTEM
44
46
IMAGE
GAZE INFORMATION
48
IMAGE ANALYSIS SYSTEM
18
DATABASE

FIG. 2